INTRODUCTION

The analysis area considered in this document includes the Great Divide Basin and portions of the North Platte River Basin that constitute the Ferris-Seminoe Mountains Ecosystem Planning area. The analysis area occupies 2,038,675 acres within the Rawlins Field Office in Carbon and Sweetwater counties of south-central Wyoming. Land ownership consists of 65% federal lands, 31% private lands, and 4% state lands. Federal ownership includes 1,300,881 acres administered by the Bureau of Land Management, 18,429 acres of withdrawn lands administered by the Bureau of Reclamation, and 1,689 acres of Pathfinder National Wildlife Refuge lands. (Map #1).

Land ownership patterns vary from blocked public lands, checkerboard along the railroad right-of-way, to various mixtures of public and non-public lands. Management has been initiated over the last twenty years to improve livestock management and address issues such as riparian health, erosion problems, and wildlife/fisheries habitat. Private individuals, livestock operators, non-profit groups, and agency personnel have all contributed to these efforts. In project planning and implementation, monitoring, education, and cost-sharing, these groups and their employees have been a tremendous help in improving the resource conditions on public and private/state lands.

The 1995 rangeland reform process modified the grazing regulations to address the fundamentals of rangeland health. In August 1997, the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the Bureau of Land Management in the State of Wyoming* were approved by the Wyoming State Director. The objectives of the rangeland health regulations are to "promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions… and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands." The fundamentals of rangeland health combine the basic precepts or physical function and biological health with elements of law relating to water quality and plant and animal populations and communities. Initially the standards focused on livestock grazing on BLM-administered lands, but the standards were developed to apply to all uses and resources.

In the Rawlins Field Office, rangeland standards were assessed on an allotment basis from 1998 through 2000. Some of the allotments contained within this watershed assessment were already evaluated, and that information and determination has been incorporated into this document. However, allotment assessments tend to emphasize management and impacts from livestock grazing, rather than on all uses which occur to and potentially impact public lands. In addition, assessing watersheds, water quality, and habitat for wildlife, fisheries, and threatened and endangered species, often does not correspond to allotment boundaries and is more logically evaluated at a larger scale. In January 2001, Instruction Memorandum No. 2001-079, Guidance for Conducting Watershed-Based Land Health Assessments, was sent to Field Offices from the Director of the BLM. This IM transmitted the 4180 Manual Section and 4180-1 Rangeland Health Standards Handbook and provides guidance for conducting assessments and evaluations for ascertaining rangeland health on a watershed basis. Under Policy/Action it states: "The Field Offices are to consider all assessment requirements for the watershed being assessed and select methods which will provide information needed to fulfill those requirements. When a field office invests its resources in an assessment, the end product should substantially meet all assessment needs to avoid conducting multiple assessments for multiple needs. For example, a well-planned, watershed-based assessment can provide the information needed for allotment evaluations, biological assessments for Section 7 Endangered Species Act consultation, and developing habitat management plans, Water Quality Improvement Plans for Total Maximum Daily Loads on impaired waters, and watershed restoration actions." In order to complete all Standard

Assessments within the original 10-year timeframe, watersheds have been divided into seven units with the upper Colorado River watershed report the first to be completed and the Great Divide Basin being the second watershed report (see Map #2).

The standards are the basis for assessing and monitoring rangeland conditions and trend. The assessments evaluate the standards and are conducted by an interdisciplinary team with participation from permittees and other interested parties. Assessments are only conducted on BLM-administered public land, however, interpretation of watershed health and water quality may reflect on all land ownerships within the area of analysis. The six standards are as follows:

Standard 1- Watershed Health: Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.

The standard is considered met if upland soil cover generally exceeds 30% and obvious signs of soil erosion are not apparent, and stream channels are stable and improving in morphology.

Standard 2 – Riparian/Wetland Health: Riparian and wetland vegetation have structural, age, and species diversity characteristic of the state of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for ground water recharge.

The standard is considered met if riparian/wetland habitat is rated in Proper Functioning Condition (PFC) and existing management will lead to maintaining or improving resource conditions.

Standard 3 – Upland Vegetation Health: Upland vegetation on each ecological site consists of plant communities appropriate to the site, which are resilient, diverse, and able to recover from natural and human disturbance.

The standard is considered met if plant communities are sustaining themselves under existing conditions and management.

Standard 4 – Wildlife/Threatened and Endangered Species Habitat Health, Fisheries, Weeds: Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.

The standard is considered met if habitat needed to support wildlife species is being sustained under existing conditions and management.

Standard 5 – Water Quality: Water quality meets State standards.

The standard is considered unknown unless information provided by the State of Wyoming determines the status of a water body as impaired (not meeting) or is meeting its beneficial uses.

Standard 6 – Air Quality: Air quality meets State standards.

The standard is considered met or impaired based on information provided by the State of Wyoming.

If an assessment shows that a standard(s) is not being met, factors contributing to the non-attainment are identified and management recommendations developed so the standard may be attained. If livestock are contributing to the nonattainment of a standard, as soon as practical but no later than the start of the next grazing season, management practices will be implemented to ensure that progress is being made toward attainment of the standard(s). The rangeland standards establish a threshold, however, the desired resource condition will usually be at a higher level than the threshold.

The desired range of conditions portrays the land or resource values that would exist in the future if management goals are achieved. The length of time to achieve the desired range of conditions would vary depending on the resources involved, the management actions required, and the speed at which different resources can effectively change. For instance, improving plant cover and litter, or changing species composition with treatments may be achieved relatively quickly in 5 to 10 years. However, developing a mixed age structure of willows along a stream by changing livestock management may take 20 to 30 years, even though it may be properly functioning. Other actions, such as restoring aspen woodlands within lodgepole pine communities by using prescribed or natural fire, may take 50 years or more.

The following regulatory constraints or special management considerations govern some of the resource values in the area:

- State of Wyoming water quality classifications and regulations on water rights, reservoir permitting, well permitting, and stormwater discharge permitting.
- Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 USC 1531 et. seq.) and the Interagency Cooperation Regulation (50 CFR 402), concerning water depletions in the Platte River System.
- Army Corp of Engineer permitting for dredged and fill materials in wetland areas located in the North Platte River Basin authorized under Section 404 of the Clean Water Act.
- Ferris Mountain Wilderness Study Area.
- Lost Creek and Stewart Creek Wild Horse Herd Management Areas.
- Lands managed by the Bureau of Reclamation, with grazing managed by BLM.
- Lands within the Pathfinder National Wildlife Refuge, with grazing managed by BLM.

The framework for this report will be an introduction and background information, followed by discussion of each rangeland standard in the order described earlier in this document. Within the discussion for each standard will be a map and description of how the standard will be addressed. The outline of discussion for each standard will follow the six-step process for ecosystem analysis at the watershed scale. The six steps are: 1) Characterization of the watershed, 2) Identification of issues and key questions, 3) Description of current conditions, 4) Description of reference conditions, 5) Synthesis and interpretation of information, and 6) Recommendations. Core topics will be discussed under the appropriate standard, with erosion processes, hydrology, and stream channels under Standard 1; vegetation split into wetland/riparian or upland under Standards 2 and 3; species and habitats under Standard 4; water quality under Standard 5, and air quality under Standard 6. Human uses would be discussed under each Standard where appropriate. Standard 1 – Watershed Health has been split into four descriptions for different hydrologic units, while the Standards 2 through 6 are each described as one unit for the entire Great Divide Basin report area.

Where discussion items are similar between watersheds, previous sections will be referenced and only additional, specific information will be noted.

BACKGROUND

Topography of the Great Divide Basin is dominated by gentle to moderately-sloping flats and rolling hills. Moderately steep to steep slopes are associated with geologic uplifts, which are found primarily around the border of the basin. These include Cyclone Rim, Delaney Rim, Atlantic Rim, Lost Soldier Rim, the Haystacks, and the Rawlins Uplift area. Elevation ranges from 6,500 feet at the Chain Lakes to highs of 8,800 feet at Atlantic Rim, 7,800 feet at Rawlins Peak, and around 7,400 feet at Delaney and Cyclone Rims. The Ferris and Seminoe Mountains are the principle geologic landmark on the northeast border of the Great Divide Basin. However, other features include Bradley Peak, Bear Mountain, and granitic rock piles scattered along the northern border, the largest and tallest being the Sentinel Rocks. Gentle slopes and valleys occur leading up to these mountains, changing to moderately steep to very steep within them. Elevations range from 5,860 feet at Pathfinder Reservoir and 6,500 feet south of Lamont, to highs of 10,037 feet at Ferris Mountain, 8948 feet at Bradley Peak, and 8,350 feet at Seminoe Mountain.

Other landscape features include:

- Seminoe and Pathfinder Reservoirs – The North Platter River forms the border on the eastern edge. These reservoirs are critical for irrigation and municipal waters supplies downstream and recreational opportunities.
- Red Desert Basin – This is a unique desert feature in the Great Divide Basin and contains essential water sources for wildlife and livestock.
- Sand Dunes South of the Ferris and Seminoe Mountain Ranges – Vegetated and unvegetated dunes west of Seminoe Reservoir.

Climate varies from arid to semi-arid depending mostly on changes in elevation. The Ferris and Seminoe Mountain ranges are the highest points and in general accumulate more snow then the lower elevation regions. Snow distribution at lower elevations is driven by wind with drifts forming in topographic features. The elevation at the Rawlins weather station is 6,736 ft., where the average annual precipitation was 9.7 inches from 1971-2000. The elevation at the Seminoe Dam weather station is 6838 feet (located at the east end of the Seminoe Mountains), which recorded an average of 14.0 inches of annual precipitation for the same period. For both of the stations April and May were the wettest months on average. Other long-term weather stations in the assessment area are located at Wamsutter and Muddy Gap, which average 6.9 inches and 10.3 inches of annual precipitation, respectively. Precipitation occurs in the form of both snow and rain, with April, May, and June being the wettest months, but with significant moisture coming anytime between March and October. The mean summer temperature for this region is 56 degrees and the mean winter temperature is 30 degrees.

The North Platte River on the Eastern border of the area is fed by snowmelt from the Medicine Bow Mountain Range to the South. The State of Wyoming has classified most of the main stem of the North Platte as Class 1 waters, which is the designation with the highest standards. In the assessment area, these reaches include between Kortes Dam and Pathfinder Reservoir. Seminoe Reservoir is classified as 2AB, meaning the waters support native and game fisheries and are protected for all categories. Tributaries in the area that flow into the North Platte are mostly designated as 2AB or 3AB, depending if the tributary has perennial, intermittent, or ephemeral surface waters. Waters that are designated as 3AB are mostly ephemeral and protected for

aquatic life, but not fish. The majority of the Great Divide basin is designated 3A, B, or C with isolated portions of 4C for ephemeral areas that support few to no aquatic species.

Soils in the basin formed in residuum or alluvium derived dominantly from shales or sandstones. Layers of both these types are often found together in alternating bands of varying thickness. Soils in the Ferris and Seminoe Mountains have a granitic base overlaid with fractured and pushed aside uplifts of sandstone and limestone. The white cliffs that stand out on the south slopes of the Ferris Mountains are part of the Madison formation, while the dark red hills bordering Seminoe Reservoir represent the Chugwater formation. Textures range from clays to loams to sands and from very shallow to deep. Clay and silt-dominated soils are often saline or alkaline, while sandy and loamy soils have had enough precipitation to leach salts sufficiently to allow them to function (effective rooting depth) as moderate to deep soils. Fine-textured soils have lower infiltration rates and higher rates of runoff with high to severe potential for soil erosion, while loam to sandy soils have moderate to high rates of infiltration and produce low to moderate runoff with low to medium potential for soil erosion. Finer-textured soils will usually have lower amounts of vegetative cover and litter.

Vegetation is predominantly either sagebrush-grass or saline-influenced communities in this region. Wyoming big sagebrush is the most common species amongst the nine species or subspecies of sagebrush shrubs commonly occurring together or in site-specific habitats. Nuttall's saltbush and black greasewood are the distinctive species of saline-influenced communities. Mountain shrubs, which include bitterbrush, snowberry, serviceberry, chokecherry, and mountain mahogany, occur in 10-inch or higher precipitation zones and are usually intermixed themselves or with sagebrush and aspen. Aspen woodland is usually found above 7,000 feet in small pockets on north and east-facing slopes where snow accumulates or there is some other source of additional moisture. Conifer woodlands occur above 7,500 feet, with limber pine and juniper on drier sites and lodgepole pine, subalpine fir, and spruce on wetter sites. Riparian and wetland habitats occur on less than one percent of public lands. Herbaceous and shrub-dominated riparian communities are the most common, with tree-dominated habitat such as cottonwood being the least common in occurrence.

Wildlife is abundant and diverse. Antelope, mule deer and elk are common big game species, with small populations of bighorn sheep in the Ferris and Seminoe Mountains. Greater sage-grouse and mountain plover are important species of interest. Raptors include golden and bald eagles; ferruginous, red-tailed and Swainson's hawks; burrowing owls; and other hawks, harriers, and owls. Other commonly observed wildlife are coyotes, badger, beaver, muskrat, cottontail and jackrabbits, prairie dogs, ground squirrels, waterfowl, and songbirds. Fisheries are most recognized for various species of trout, which have all been introduced into streams and ponds for recreational use. Increasing attention is being directed at non-game fish species found in the North Platte River drainage.

The Lost Creek and Stewart Creek Wild Horse Herd Management Areas (HMA) are located in the blocked public lands in the northwest portion of the watershed, west of highway 287 and south of the Green Mountain and Crooks Mountain wild horse herd areas. The Lost Creek herd's appropriate management level (AML) is between 55 and 85 wild horses spread over 250,000 acres. The Stewart Creek AML is between 120 and 180 wild horses that roam over 230,000 acres. Both HMAs have limited water sources and few fences. The Lost Creek HMA is not fenced separate from checkerboard lands to the south or from the wild horse herd area to the north.

The Ferris Mountains Wilderness Study Area (WSA) includes most of Ferris Mountain, and consists of 22,245 acres of public lands. A small mountain range, its ruggedness leads to the perception of a larger size than it actually is. Along portions of its length, deep canyons prevail, while steep slopes are common throughout making for extreme local relief. These features have preserved a natural state and condition, essentially roadless and undisturbed. Numerous streams flow out of the mountain, but with limited areas of meadowland. Fire scars are common and various densities and age-classes of conifers dominate the landscape. Wildflowers are abundant and diverse, creating a colorful splendor during the spring. There is a register for ambitious hikers at the top of Ferris Peak.

Human population levels are low, with approximately 9,000 people living in Rawlins, the county seat, with other small populations of people living in Wamsutter, Bairoil and Muddy Gap. Improved roads are limited to the paved state highways and dirt and graveled roads maintained by the county, federal agencies, and, more recently, by mineral development companies. Human use on public lands within the Great Divide Basin is generally related to oil and gas development, livestock grazing, and recreation.

Natural gas development is extensive in the area around Wamsutter and is expanding to the north and east, while oil fields occur in a small zone around Bairoil. Extensive, undeveloped coalfields have led to the recent exploratory development of coalbed methane on the west sides of both Seminoe Reservoir and Atlantic Rim. Recent infield development of natural gas fields around Wamsutter is reaching the density of one well per 80 acres, with lower density development ranging from one to four wells per 640 acres.

There are 48 allotments permitted for grazing use on public lands in the watershed analysis area. Grazing use is approximately 90 percent cattle and 10 percent sheep, with winter or seasonal use at lower elevations and only summer or fall use at higher elevations. Historical use in this area developed as both cattle and sheep use, depending on the location. Cattle numbers have slowly risen through the years, with most conversions to cattle happening in the 1960s through the 1980s. The Taylor Grazing Act in 1934 began a process of creating allotments, which has led to greater stewardship and on-the-ground management. Fencing of allotments has been an ongoing, long-term process, with pasture fencing becoming more common in recent times. Table #1 lists the allotment name, number, and the factors for each allotment, which were used to prioritize monitoring in the standards assessment, and corresponds to Map #3 depicting allotments within the watershed. This table was created using monitoring data, PFC assessments, and professional knowledge, as well as information or knowledge about these allotments from other agencies. Typically, the allotments with the most boxes checked will be the areas needing the most attention. Best Management Practices (BMPs) describe various actions which have or can be implemented to change impacts from grazing management. They include altering the season, duration, or type of livestock use, as well as the use of herding, fencing, water developments, vegetation treatments, or other tools where appropriate.

Recreation use includes hunting, fishing, camping, wildlife-viewing, ORV use, and traveling the Continental Divide National Scenic Trail. The numbers of people involved in these activities are generally low except during the fall hunting seasons.